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CLIFF OF BUTTE ROOF MOUNTAIN

THE National Geographic Magazine

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SEPTEMBER, 1898

No. 9

THE GROWTH OF THE UNITED STATES *

By W. J. McKEE,

Vice-President of the National Geographic Society

With the annexation of Hawaii an end came to America's longest period of inactivity in territorial expansion. During this period of thirty-one years—nearly an average generation—the great fact of almost unparalleled expansion in earlier decades had been half forgotten.

Beginning with an area of 827,844 square miles and a marine coast line of full 1,500 miles, the nation concentrated energy on internal affairs for twenty-three years; then, in 1803, the Louisiana purchase was consummated and Oregon territory was acquired, adding 1,771,981 square miles to the national domain and 1,000 linear miles to the coast line; so that at a single bound the territory was more than doubled and the coast line nearly doubled, while an outlet was gained on the Pacific. The material expansion was quickly reflected in a widening of intellectual horizon among the people, who were thereby confronted by new problems; for, under republican organization, national problems are problems of the people rather than of leaders only. The immediate result was renewed intellectual and industrial activity and the implanting of a trait which has since become national, i. e., enterprise; the more remote effects included development of interior commerce, the application of steam to inland navigation, the founding of a foreign carrying trade, and the real opening of that career of invention and manufacture which has given character to the American people.

* An address delivered at the First Session of the National Geographic Society and the American Association for the Advancement of Science, Boston, August 23, 1898.

After eighteen years of internal development, with a single international episode, Florida was acquired (in 1821), adding 59,268 square miles of territory and nearly 1,500 miles of coast line; and such further impetus was given to enterprise that the more southerly Americans soon found their territory too narrow and pushed beyond the border. A consequence of this overflow was the separation of Texas from Mexico, followed in 1845 by the annexation of this empire of 375,163 square miles, with 540 miles of coast line; another consequence was the treaty of Guadalupe Hidalgo in 1848, bringing in California and adjacent territory amounting to 345,753 square miles and adding another 1,000 miles to the coast; and a less direct consequence was the Gadsden purchase in 1853 of 14,541 square miles, rounding out the home territory to its present area of 3,025,600 square miles, with some 5,500 miles of open coast.

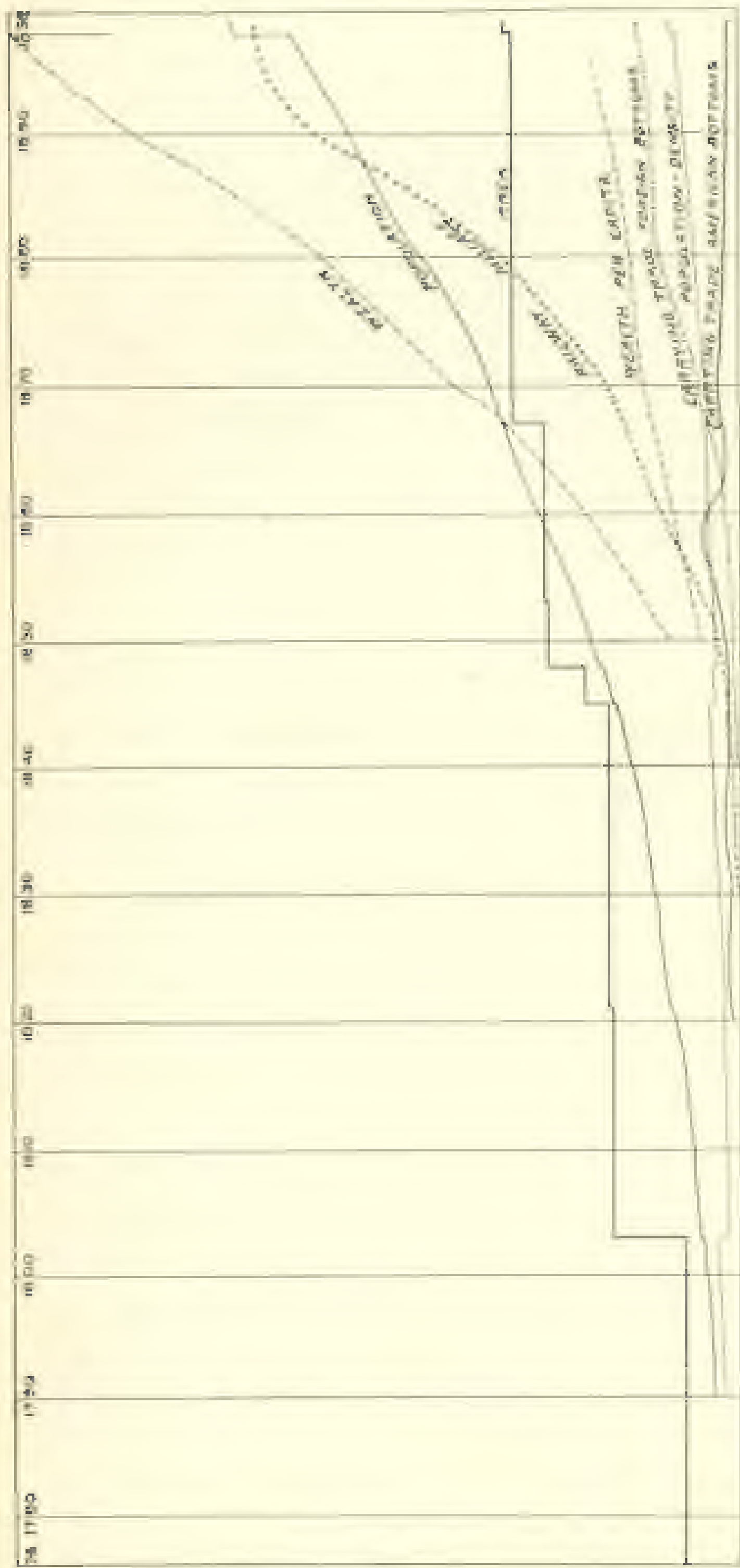
This career of territorial expansion in the half century from Louisiana purchase to Gadsden purchase forms the most striking chapter in national development afforded by the history of the world. In the first place, the actual expansion in territory and coast line was almost unparalleled; the area was nearly quadrupled and the coast line more than tripled. In the second place, the greater part of the acquisition was amicable, coming in part as a voluntary offering, while in no case did armed force play more than an incidental role; there was no conquest in the sense in which the term is used in other countries. In the third place, the expansion was beyond precedent in the completeness and promptness with which the new territory was utilized and the new conditions assimilated; with each areal addition national enterprise merely found a curb removed and spring spontaneously to meet the new tasks and new problems presented by the new territory; and the energies of the people, withheld from martial conquest by moral sense, turned with unprecedented vigor to the conquest of nature, to the conversion of natural forces for human weal. Finally, the effect of the expansion on national character—foreshadowed by the advance of 1803—was beyond all parallel; for enterprise interacted with enterprise, and brought forth an individual and collective activity among the mass of citizens such as the world had not seen before.

After 1853 the nation rested from expansion for fourteen years, of which four were devoted to the solution of grave internal problems; then (in 1867) a bargain-counter acquisition, giving little

promise of early profit, was made, whereby a territory estimated at 531,000 square miles, with a relatively extensive coast line, was added to the national possessions. The influence of this purchase on national progress and on national character was limited, save as a hard-worked occasion for criticism of the policy of territorial development. The reaction from the internal tension of the early '90s and from the nearly profitless expansion of '67 naturally made itself felt in public policy; it is expressed in the thirty-one years of respite from external growth. Now, after long begging for admission, as Texas begged fifty years before, Hawaii is admitted, with 6,640 square miles of area and a wealth of coast line; the garden island of Porto Rico, 3,670 square miles in area, is gladly entering the domain of America as an incident of a war for humanity's sake; and the hundreds of Philippine islands, comprising 114,325 square miles of aggregate territory, are looking to America for protection and ultimate absorption. Considered merely as territory, these additions, aggregating 124,635 square miles, would form but a ripple on the stream of national progress, even if consummated at once; the area is little more than twice that of the Gadsden purchase, less than twice that of the Florida purchase, only a third that of the Texan annexation, less than a quarter so large as either the Californian acquisition or the Alaskan purchase, less than an eighth of the nation-shaping acquisitions of 1803, less than 4 per cent of the previous area.

Apart from the events of 1898, one of the striking features of American history has been almost unparalleled territorial expansion with quite unparalleled territorial assimilation; and, viewed in the light of this history, the comparatively slight expansion of 1898 but marks the resumption of a career temporarily checked by a combination of circumstances.

The territorial growth of the United States has been shaped constantly by natural conditions rather than national policy; for, since the days of the first President, it has been the idea of the American citizen to avoid "entangling alliances" and foreign complications. Partly for this reason, the rapid enlargement of the domain of the United States met opposition at every step from conservative statesmen. The Louisiana purchase was almost a surprise even to those by whom it was consummated, while a large part of Oregon territory was literally thrown away in 1846 by dint of political nonentering, despite political platforms and the wishes of the inhabitants; and the self-pro-



Indicator	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020
Area, in square miles	3,717,000	3,717,000	3,717,000	3,717,000	3,717,000	3,717,000	3,717,000	3,717,000	3,717,000	3,717,000
Total population	12,000,000	15,000,000	18,000,000	22,000,000	25,000,000	28,000,000	32,000,000	35,000,000	38,000,000	40,000,000
Population density	3.2	4.0	4.9	5.9	6.7	7.5	8.6	9.4	10.2	10.8
Income per capita	100	150	200	250	300	350	400	450	500	550
Unemployment	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%
Government expenditure	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%
Foreign trade, percent of GDP	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%
Foreign trade, percent of GDP	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%

posed annexation of Texas was successfully resisted for years. The acquisition of California was regarded as a special menace, for the reason that its fertile valleys and commodious harbors were distant three months' journey by land and six months' voyage by water, while the territory was inhabited partly by treacherous aliens but mainly by savage tribes; yet cautious statesmen, emboldened by the success of the Louisiana purchase, ventured on the step despite the fact that America was still an experiment in nation-making, with no standing among the powers, with a population of but 20,000,000, and with narrow commercial and industrial resources; and the step proved the most important in the career of the nation. In this as in other cases the territory was ripe for acquisition by an enlightened nation; the inhabitants were ill-governed and desirous of change; there was a need, more or less fully felt, for the extension of enlightenment to the dark places. In no case, save possibly that of Alaska, has expansion grown out of mercenary motives; yet in no case, save possibly Alaska again, has the acquisition of territory failed to benefit the inhabitants of the territory acquired, the nation which made the acquisition, and the world at large. America's progress in territorial development has never been the outcome of ulterior policy; it has always been an expression of manifest destiny.

The various elements of national growth are intimately related; some of them are shown graphically in the accompanying table and diagram.* The fundamental element is area, which is indicated in the line plotted by ordinates and abscissas in such manner as to show quantitatively the territorial acquisitions and the intervening periods of inactivity, the line being projected on the assumption that the entire area of the Philippines as well as Hawaii and Porto Rico will be absorbed during the year. The next element is population, which is shown graphically from the Census figures of 1790 and later decades; it, too, is projected on the assumption that the 100,000 people of Hawaii, and also the 800,000 people of Porto Rico and the 7,000,000 people of the Philippines, will be added to our population during the year. A fraction of these elements combined is population-density (*i. e.*, the average population per square mile), which is plotted

* The values are mainly taken from Sumner's "Statistical Atlas," recently published by the Census Office, partly from the "Statistical Abstracts" for 1901, recently published by the Bureau of Statistics of the Treasury Department, partly from the "Statistical Year Book" for 1900.

from the Census figures with the same assumptions concerning expansion during 1898. The three lines of the diagram express several salient facts in American history: The territorial acquisitions have been enormous, much more than quadrupling the original area; no accession (up to 1898) has materially affected the population curve, yet the population has steadily increased by a normal growth of beautiful symmetry; the density of population has also increased in a symmetric normal, interrupted by each of the greater accessions in area. The only noteworthy break in the population curve is that representing the gaining of the Philippines, though even this does not materially affect the density curve.

The steady increase in density of population in the United States is a striking and promising feature of national development; it is an equally striking and still more hopeful fact that, so far as the Census values permit determination, each accession has stimulated the increase of population and has soon been followed by an increased population-density.

While each accession of area has tended to hasten the increase in population, other effects of even greater significance have followed, though figures for the expression of these effects are lacking for the earlier decades in the history of the United States. The immediate effect of the acquisition of Louisiana and Oregon was increase in navigation, both oceanic and interior, with a decided advance in domestic commerce; bonding enterprises was directed to invention and steamboats were placed on the rivers, while improvements in agriculture were diligently sought. These advances were stimulated anew when Florida was acquired, and American carrying trade came to be a factor in the progress of the world. During the period of concentration following these acquisitions, canals were projected as auxiliaries to the natural waterways, while railroad building was gradually introduced as a sort of auxiliary to river and canal. Then came the epoch-marking accessions of the mid-century, with the necessity for more expeditious transportation facilities than navigable waterways and ocean-going vessels could possibly afford; and native genius responded by improving locomotives and railway-building beyond the most sanguine dreams of progressive statesmen, and made America a railway nation; and the curve representing railway development is one of the striking features in the graphic history of the United States.* The carrying trade

*The decline in railway building after 1891, shown in the diagram, should not be misinterpreted; it merely marks the gradual substitution of electric locomotion for steam, etc., for electric locomotion.

in America, but does it so consistently and its increase for a
century must keep pace with the growth of the country; but the
material could not be where it is needed. The railway is necessarily ex-
tending westward and upward toward the "backland" and the
countrymen of it, who internal commerce developed those and vi-
cinity as early as they were not resumed but permitted to
be left to grow up. Accordingly there is a notable element
of American growth which is of magnitude and for a long
period in which the use of brilliant growth of the American pro-
ducts and the use of the American country being the most likely
country representing the American country to be the most
likely to be some time 1820 to 1870.

[illegible]

are lacking but since 1850 wealth has increased more rapidly than any other measurable factor in national progress, as indicated by the regression curves in the diagram. In the last half century the population of the United States has more than tripled, yet the wealth has more than fortyfold, and the per capita wealth of the American citizen has risen far above the rates and averages for the other countries. This element of growth, then, is correlated with the increase in area, because the special necessities of land a century ago for, although the statistics are wanting for the first half of the century, the expansion of the latter curves shows that the rate of increase must have been at least continued or increased almost invariably after the acquisition of Texas and California.

In reviewing the factors of national progress, it becomes clear that territorial expansion, great as it has been, is not the principal cause if population has increased more rapidly than area, while wealth has advanced more rapidly than population—evidence which shows that American progress rests in the conquest of nature rather than in the conquest of territory. Yet it is possible that our every territorial acquisition gave new opportunity for growing enterprise and was more fully followed by new industries, new means of life, new lines of thought, all contributing to the increased national wealth and a high rate of national progress. It is less certain that the elements of territorial expansion have a special character of their own for progress. The Louisiana purchase opened a land and a population of 20,000,000 and a new frontier. The conquest was not by the native genius which is necessary with us, and the best system of land system in the world was developed in the north. The conquest of California created a demand for the transportation facilities, it was not by the level plains of the American mid-west system. The pushing of our frontiers to the new frontiers created a new frontier. It has been not by the development of agriculture, but by irrigation laws and other features of an irrigated society.

It is not a mark of a great nation and a great people that it seems clear that the several factors of development are interrelated, a common or mutual and necessary growth. It is not a mark of a great nation and a great people that the growth of the United States, that the population has expanded so early decades was not too rapid for assimilation in the national structure, yet was rapid enough to be a mark of a great nation.

A glance from the history of the nation to the century's history of the world advances for force and beneficence of the American example, the relations are too many for even summary statement; it may only be noted, that the association of Americans abroad and the relation of Americans abroad to other peoples and nations proves that the progress of the nation is meeting a need of the world.

[illegible]

[illegible]

From this base line was extracted a system of transfer lines which were expected to be great improvements on the base line system of 1947, an average error of 2 seconds. However, these lines were extracted as direct indicators without further improvement. They therefore contained what the engineer suggested to be unneeded properties, although they were fairly good examples of a good way to set up a system of direct indicators. One of Mr. E. C. Johnson's observations on the construction of a relay engineer in the mechanical programming of the motor block transfer and the design of a relay bank. He will be assisting in charge of engineering Messrs J. H. Johnson and H. S. Lockhart.

The boundary line of the Reserve was defined in part by the boundaries of the public land system, none of which had been surveyed. For the purpose of locating across the Reserve the line for establishing a line a foot wide of a low ashup and was established. He projected a special party under Mr. H. C. Russell, was organized and the results of this work were the determination and marking up of the greater portion of a western boundary. It is estimated as being in the line of the Reserve. It is noted that all timber here is made up of a side with a small amount of white oak and a heavy oak forested with a heavy oak forest of white oak and a heavy oak forested with a heavy oak forest. The work of this class of work was entered many times, as the forested trees were of strength and were able to accomplish a little at a large expense that the question of the feasibility of

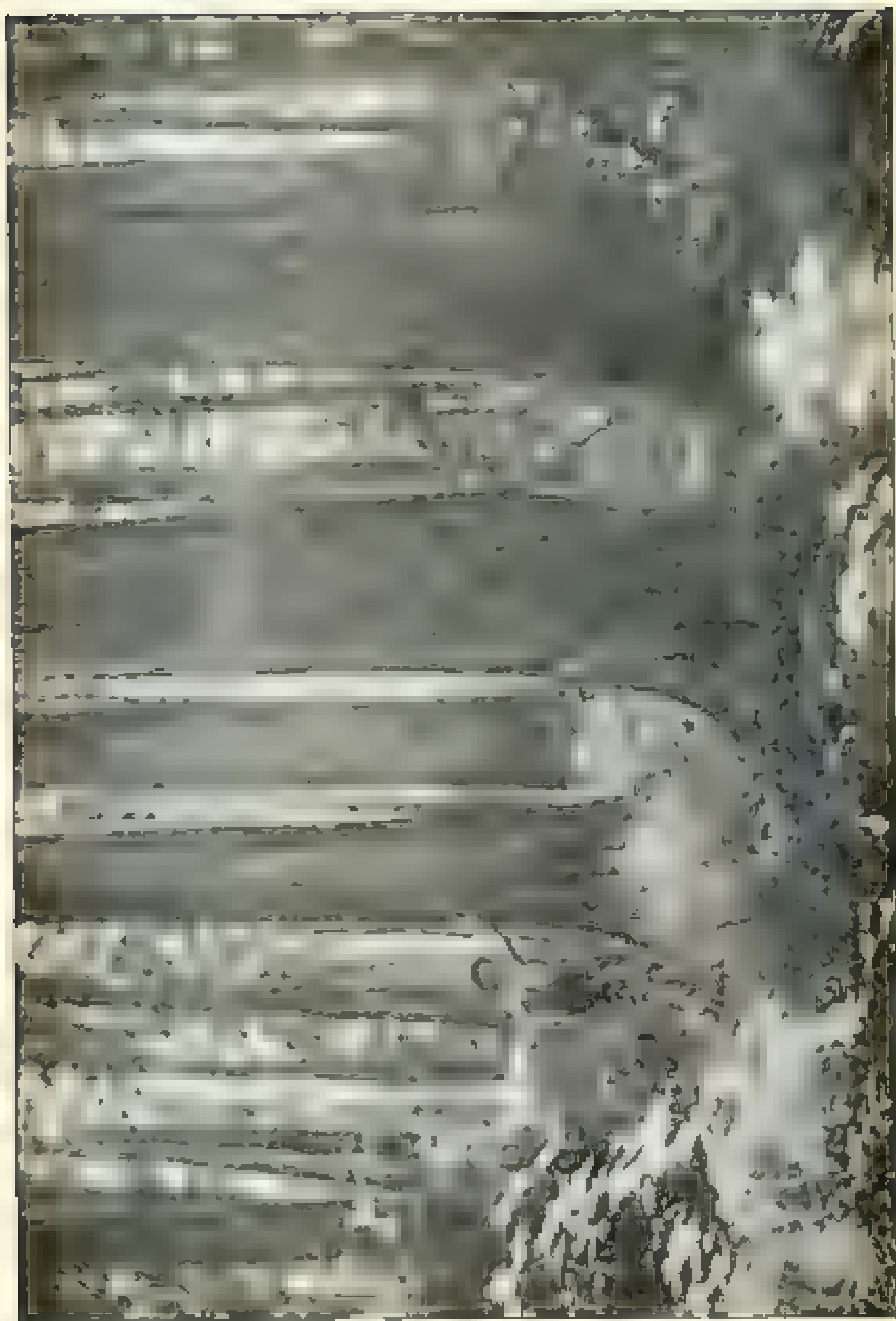
2271. Total acid = 0.001462 gram of acid and the hydrogen 1.76 (the H₂SO₄ and Na₂S of the salts as showned here are taken as 100 per cent)

Nearest distribution of water is pit to property included in the lot or lot not more than 1/2 acre has ever been a relatively certain one, but the very existence of a different lot from one as to the ownership, by of the property is to satisfy they not to the owner present, but there may be no doubt that not of the reserve or the other lot in the lot within the limits of the lot, but the lot is a lot of the water in the lot or lot and therefore to be taken as a lot of the water in the lot and as new lots are being built to build.

It extends, therefore, to the crest line. This has no corresponding extension southward from the vicinity of Lake Umbagog to the low divide at the south end of the latter. The boundary between the two ages of the latter Rock system is that of the middle fork of the Salmon River. It is thought that these two distinct systems do not include any, any further southward, as it is considered advisable to classify the latter Rock group as entirely belonging to the Devonian system. The continuation of the boundary toward the west and southward by the ridges of the Massachusetts Sea. All properly included in the Devonian Mass. system. The northern part of the latter Rocks, as James collected, was regarded as that of the Devonian system, as it is believed that the latter system is not having coordinate rank with any other body of rocks of about the age, and the assigned as a subordinate part of the latter Rock system. If not a fault, it is the limit of other rocks of the Devonian system as in the Devonian system. The Devonian system is thought to be the Devonian system.

of the river valley between the northern and southern limits of the system known to have one valley and that is, the drainage of the Clarke Fork of the Labanah. I am inclined to believe that the Saline River also is fed by the southern limit of these mountains. Just how far to the westward the stream has been turned and what a dig it has cost, I do not know, but it is a very interesting fact. It may be a continuation extending toward the Snake River plains, in that case it is identical with the Labanah. It is a beautiful view of the country the Clarke Fork is a continuation of the great river of the same character as the Labanah. A fine view can be obtained from

an Internet, i.e., the global domain system, as that we want to
 these subtypes are the Internet, the Internet and the

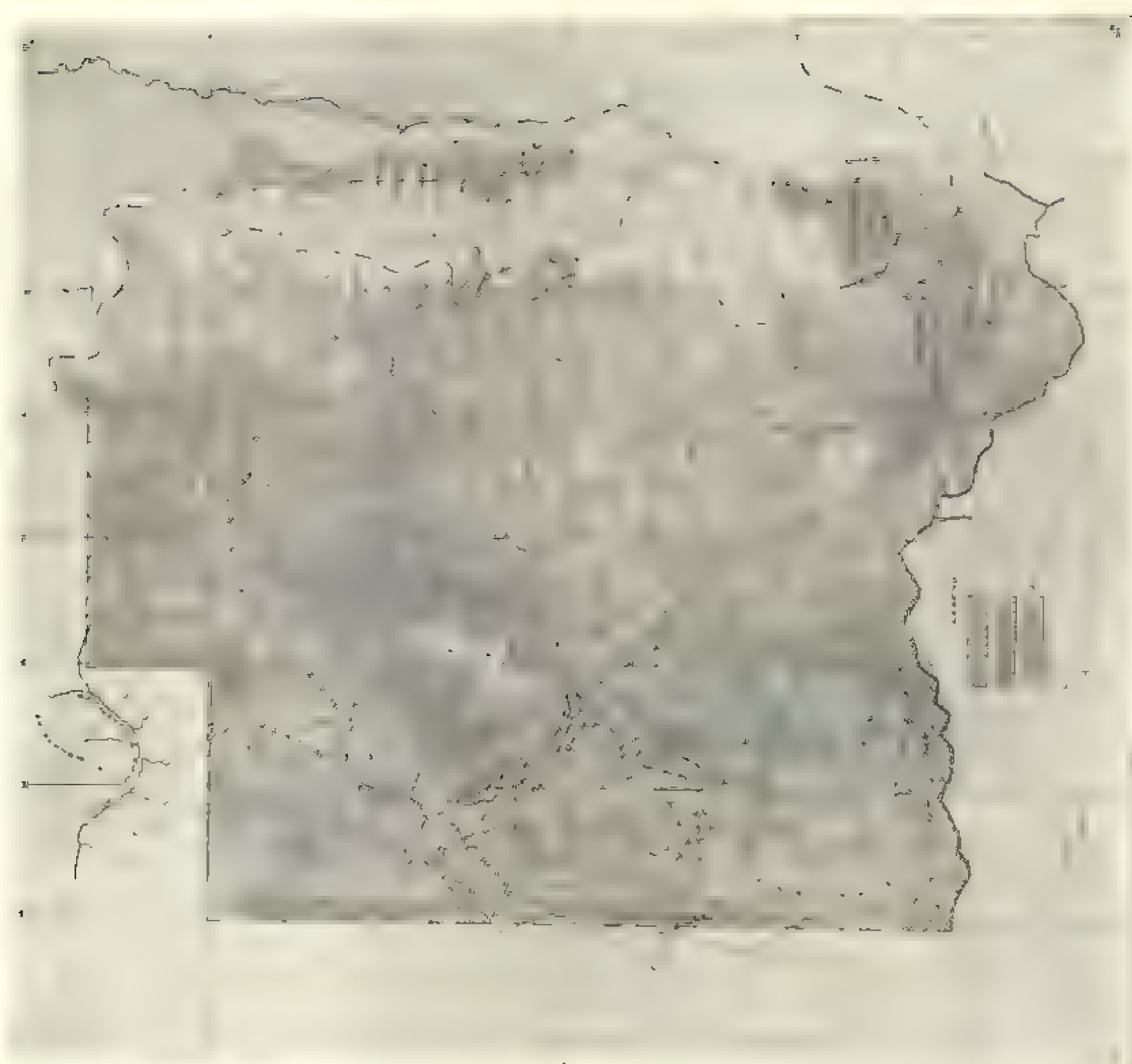


The portion of the Reserve west of the mouth of the Little Rock River is small, but yet it is not all also is drained by the Clearwater and Salmon rivers, and at 100 per cent of the territory lying to the west of the Little Rock River. Each of these streams are tributaries of the Snake River, and Clearwater forms a large fraction of the water of the Salmon about 50 miles above its mouth. The Snake River has no important tributaries within the limits of the Reserve. The Clearwater has but few principal branches—the North Clearwater is the largest one of which is large & north of the Reserve, the Little Snake or Middle Clearwater which has its source about the base of Mt. Mary's and extends to the west, the Middle Clearwater, which drains the forest land from Lost Horse pass to the Nez Percés pass, and the South Clearwater or Ardenian river, the smallest

of the Reserve and extends west a few miles of the canyon of the Salmon river. It may be noted that on the boundary of the Salmon river a line has been drawn on the best existing maps was found to be in error by from 10 to 15 miles.

The streams constituting the Clearwater system flow generally in a westerly direction, and while the various hills and ridges form a most every direction, the general result is a series of secondary east and west ranges which have no well defined connection with the main range. The summits of the ridges are from 2,000 to 5,000 feet above the surrounding country, and each ridge rises to a more or less general elevation, so that were a surface laid through all the crest lines it would be of an undulating and moderately regular character. We may therefore assume with some degree of certainty that the surface represents an undulating topography formed by a period of protrusion of elevation to which the country was reduced after a long period of erosion.

The rocks of the Little Rock are of a granitic and syenitic composition, the former being the northward continuation of the enormous granite mass of southern Idaho, one of the largest in the United States. The syenites which are confined to the western portion of the Reserve, constitute a part of the belt formed by these rocks along the coast stratified basalt of the Rocky Mountain region. At some period when the Canadian sea the great body of granite out of which the mountain was carved was exposed as a bare and bare from the low up waters of the sea. The molten rock cooled slowly, as is shown by its coarseness of grain, and it must have cooled beneath a cover of slates but this cover has been almost entirely removed and the



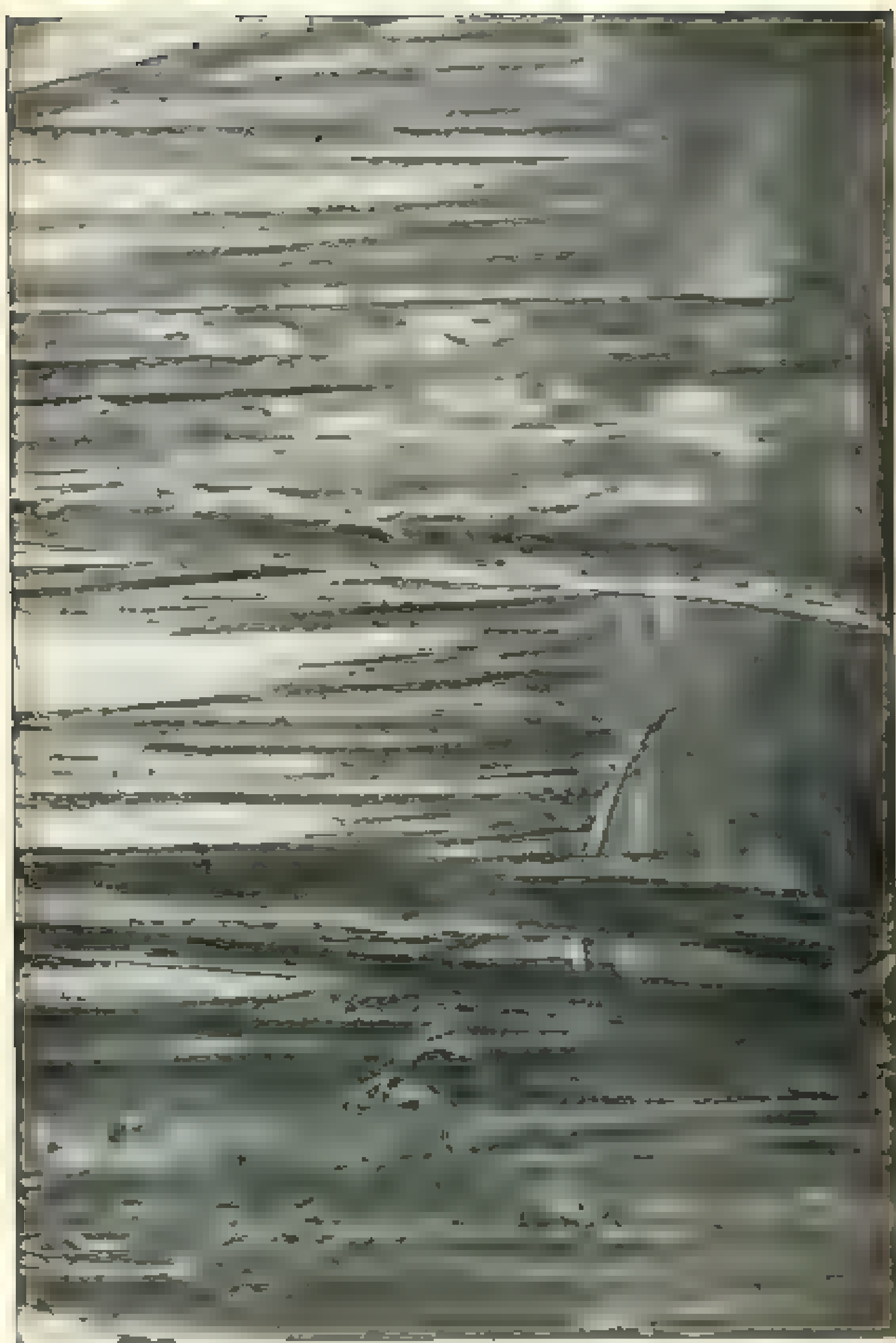
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glacier is itself deep vented and somewhat. At the bottom where the glacier is melting, it was in fact a predominant feature in the Yellowstone Park and the great main flows of basalt dammed up the Snake and Salmon rivers west of Boise from which the latter River comes was effected by forcing of the earth so that the drainage was in many cases reversed and the latter River itself was turned back, forming the Bitter Root Lake, which was over 2,000 feet in depth.

The over-laying waters of the lake gradually deepened the bottom and drained the lake, clearing out a large part of the bottom and work not yet so far as is concerned, as the valley has not been cut down to its former level. The many lakes were lost and the number of sphagnum bogs and bog peat bogs and the result of glacial scouring.

In connection with the commercialization of every a forest now was prepared, and it is possible that we will find a number of features of the forest in the present way, a number of having been found to a different the species. Two species of forest trees are out to the M. (the) and one of the latter does not deserve the yellow pine and the spruce, but, about one fourth of the growth and adding to the forest, which has a range from the lowest elevation at 5,500 feet and three feet higher to the latter which has a range from 4,200 feet to the highest altitudes. In the yellow pine and the yellow pine consist of trees about 90 per cent of the growth and the lodgepole spruce about 10 per cent, the remaining 10 per cent being distributed among the other trees in the zone, the lodgepole spruce, white fir, and balsam fir. In the spruce zone the lodgepole pine constitutes by far the greatest part of the growth, 90 per cent of the growth, the remainder being 10 per cent being yellow fir, white bark pine, white fir, lodgepole spruce and yellow spruce speaking, only the yellow pine should be classed as commercial timber as it alone is used for lumbering purposes and all the other pine wood is for the small timbering, the fir, spruce and white bark pine, as they may be applied to local purposes and have to that extent some commercial value. The yellow pine may be considered as commercial timber growing, as shown on our map, in western the Bitter Root valley and the north.

The spruce is found as high on the mountains as white pine. It is being reported that the Bitter Root Forest is entirely a white timber zone as everywhere, even on the highest mountains and



are of north western dip and covered in "typical" dolomite capping, both resulting from the lowering of the river valleys to the sea. These typical dolomites are rocks of uniform texture and flags in form extending to sea.

At the same time, however, it provides a good illustration of the fact that, even if \mathcal{C}_1 makes reliable inferences about \mathcal{C}_2 and \mathcal{C}_3 , it may not.

It is noteworthy that the estimated long-run costs for the technology

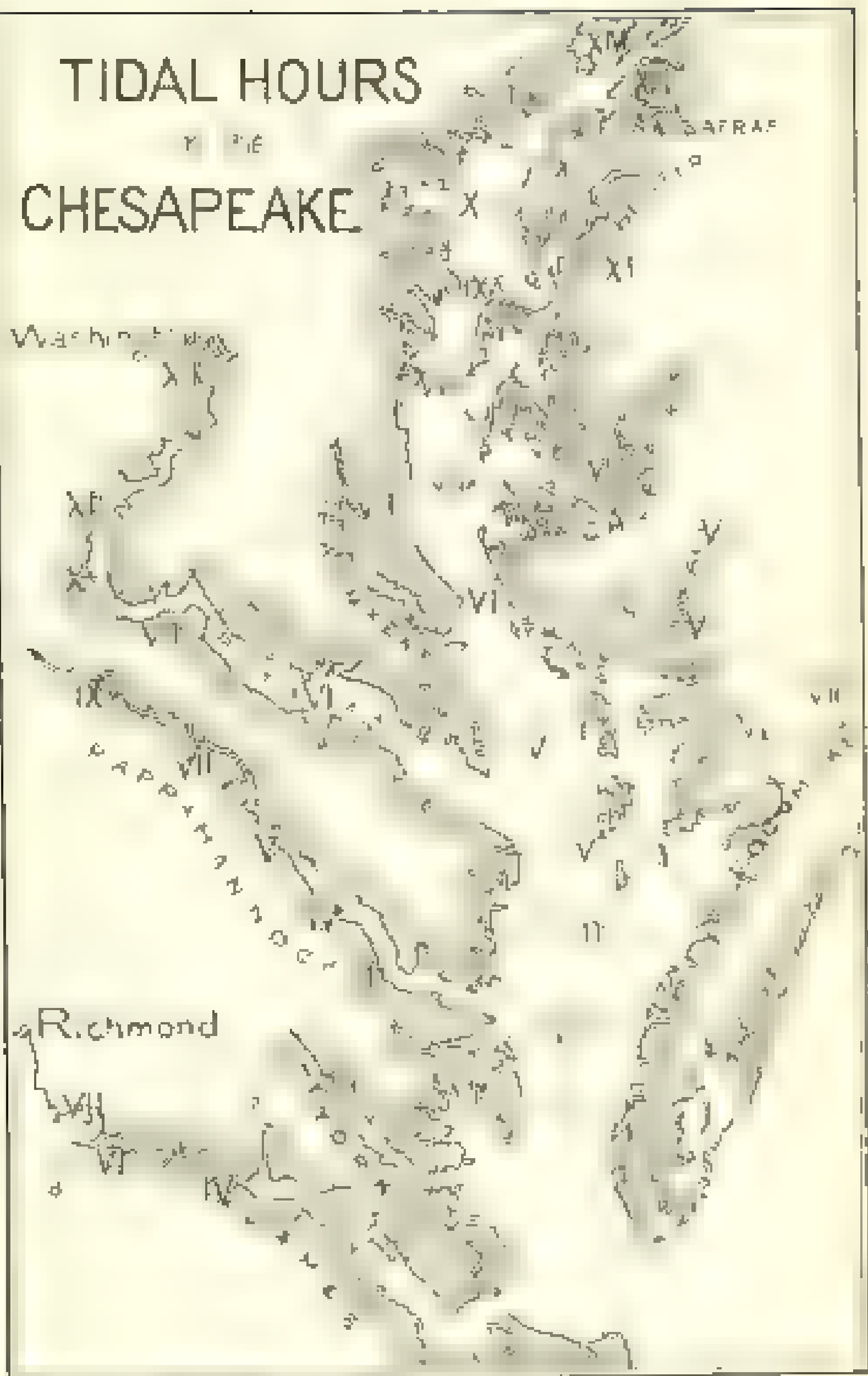
[7] 44 443 117, 118

The dotted lines on the \ln represent the positions of the projected wave-front at successive even times after it passes the tapes. They are numbered with Roman numerals to the right,



It is felt that range being placed given a Δt is number $n = \frac{1}{\Delta t}$. Therefore, $f = \frac{1}{\Delta t}$ is called the number of cycles per second. The word "frequency" still appears in use, but it is very uncertain the accuracy of the following wave-front. From a table it is still a very poor idea to use a Δt greater than for the first three hours. As to the construction of the wave-fronting is used. It can be used for the

TIDAL HOURS OF THE CHESAPEAKE



and so all the ranges are said to result. The largest of these is supposed to result at the full moon, so the ranges for the moon were taken to be the highest station of the moon.

ST. LAWRENCE TIDES.

The St. Lawrence is an excellent example of a tidal estuary and it is to be desired that more accurate data may soon be forthcoming for this bay. For the present purpose we must exclude the portion of the ocean in reach between Pointe des Monts and Antwerp where the tides are not explained. The "bay" and river remaining are 254 miles long and 14 miles wide at the mouth. When high water has reached Three Rivers a second high water point at the mouth of Antwerp. The bay is in the waters between Pointe des Monts and Isle d'Antwerp where it is over to Three Rivers. The U. S. Tide Tables give 22 stations here, from which what has been prepared is before.

St. Lawrence Tides.

0	I	II	III	IV	V	VI	VII	VIII	IX
0	20	30	40	50	60	70	80	90	100
10	20	30	40	50	60	70	80	90	100

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

During the first four hours the tide rises up the bay with least impediment, while the tide range slowly and gradually increases and the tide range slowly and gradually increases. At Three Rivers, the head of navigation is the rise of the tide to the full tide, 7 ft. 5 in. — a strong ebb coming on the wave is a rather 28 ft. of water. This may be due to the great depth of the St. Lawrence. The Port of Three Rivers is in these respects in a similar position.

The Bay of Chaleur, a hundred miles long and twenty miles wide at the mouth, is a good example of the ranges increasing from 4 feet to 7.5 feet and high water being reached. There are but a few stations, the tide tables, which are not at the full tide of 10 ft. It is clear that the tide-water is a good example with its first looped deep, by the bay as is probable with the St. Lawrence and the bay.

ST. JOHN RIVER, TEXAS

Our data here are all for specimens of July and August, being due to a study by A. Wilmer Hall*. In putting these data into the usual form, the time in years have been taken from Indication A. Although the estuaries are a good river type, there is a marked feature in the bottom and in the river mouth. The entrance to the Bay of Faculty at the city (St. John) is an estuary from 1 to 25 miles long with a spring tide range of an average of 27 feet + to 30 of rise, 5 h. 30 m. + fall, to 145 m. Back of the city + the waters of the river, previously occupying a channel remarkable for its extent and breadth, become at once confined in a narrow gorge (width) 1 as the river descends on a band of pre-Cambrian rock crossing the stream obliquely at an angle a barrier over which the waters of the river and of the bay then alternately flow in the great volumes of the harbor + river at a low known rise of the tide, it would appear that the inward flow over this barrier at the suspension bridge is from 2 to 10 feet wet, but as the outward fall is wholly confined to the outlet of the flood tide, maintaining its maximum with the low after a 1 hour + 10 min. receding the interval during which the river is relatively motionless is greatly limited, not exceeding twice or four hours out of every twelve. Notwithstanding this limitation, however, the effect is so far to set back the stream as to produce, except in the case of freshets, a retardation of inward and downward currents, accompanied by a corresponding increase of level which is appreciable even at fresh water, a difference of over 30

feet + 100, being at low water, is a rise and fall

of 10 + 15 feet in the twenty-four

hours. There are to be made portions of level water, and also a condition of safe passage. At very low tides (10 Apr. and May 1900) no inward flow is detected and no rise is noticeable.

There has been some discussion as to the propriety of calling the estuary a tidal river as the St. John river does. Mr. Hall's investigation, however, seems to agree. The use of the word "tidal" at present, and "estuary" at first is merely born of the popular idea of the Narrows, they are both tide rivers. The stages in the tide, according to the river bottom just a short distance from the Narrows. The tides in it rises.

* In a report of the U. S. Fish Commission, Vol. 1, p. 100, and Vol. 2, p. 100, and Vol. 3, p. 100.

Example Table

h	l	$2l$	l^2	18	H	H	Vertical Tidal Height
a	b	c	d	e	f	g	h

The river, Connecticut, seems to have a very regular tidal bay table. There are but few observations.

Example Table

The Connecticut has its mouth in the same or region of the tidal bay and the discharge is a small quantity of water, so that it keeps its head to the sea and no other arrangement. The pro-

duct is constant, some 1000 cfs, and the tide is very regular.

Example Table

h	l	$2l$	l^2	18	H	H	Vertical Tidal Height
a	b	c	d	e	f	g	h

h	l	$2l$	l^2	18	H	H	Vertical Tidal Height
a	b	c	d	e	f	g	h

The stream is narrow, from a quarter to three-quarters of a mile, and shallow. The sand generally adds a natural explanation for the lack of the "bay". The lower course of the river is in rocks so hard harder than the upper course that the lower valley was dry-like before flowing. The portion from the sea to the lack of a uniformity of rock texture along the river.

Example Table

The river is also a narrow gorge in the lower course and has no bay or bay-like. Nearly no narrowness the Connecticut, but deep, a narrowness in the rapid transmission of the tide wave. The 111 miles to Albany are traveled in 10 hours and 8 minutes.

Atlantic River Tides

II	I	II	III	IV	V	VI	VII	VIII	IX	X
0	10	20	30.5	42.5	55.5	68.5	81.5	94	106	118
	1.2	2.0	2.7	3.5	4.2	5.0	5.8	6.5	7.2	8.0
12	13	14	15	16	17	18	19	20	21	22
13	14	15	16	17	18	19	20	21	22	23

The two curves below, which I owe to the courtesy of the superintendent of the Coast Survey, show the character of the observation at Albany and Sandy Hook. Both are of the same station and they will illustrate the extremes met in a river. The Albany, i. e., figure A, shows the characteristic steep front of waves that have traveled far in shallow water. The Hudson gets

least seven miles farther out.



Following this examination of estuary tides it appears that they vary from the type in our diagram as their estuaries vary from the type of a river valley, or narrow channel, or wide bay, partly enclosed in the sea. The two main features of the geographic type are the Atlantic coast results from the tendency of eastward winds to close the river mouths. This tendency is evident in the results of the Hudson and Delaware. It gives the estuary wave lines of a river type and the waves that are met of the Delaware valley a farther south, forming the curve in which the estuaries are less generally closed by the effects of prevailing winds.

THE FOREST CONDITIONS AND STANDING TIMBER OF THE STATE OF WASHINGTON*

by HENRY CANNETT

During the past year I have been actively engaged in collecting information regarding the forest resources of Washington, one of the richest in timber and the state in which the amount of industry is most active west of the Mississippi river. The information which has been collected consists of the reports of the lumber companies, a survey of the land and a list of the best commercial tree species examined, and the distribution of the five species recognized by the lumbermen of this part of the country, namely, red fir (*Parlatorea p. filia*), Sitka spruce (*Picea sitchensis*), and white fir (*Abies concolor*) (*Abies grandis*), and yellow pine (*Pinus ponderosa*).

The figures, as they can be obtained, are by townships showing the area covered with each timber, and the approximate total of each species. The figures are not improved by a satisfactory means, reliable for all the areas which have been mapped, but they are generally deemed correct, and the few which are still in need of a check. Altogether I have mapped the state of Washington, a total area of 1,661,400 acres, or 2,600 square miles, which are pretty fairly roughly scattered over the state. In addition to this area has been included the area of the Washington Indian reservation, 1,610,000 square miles, making the total covered. The area is not so much scattered over the state as it is in the United States, for the area which is not covered by forest is not so large. The forest is abundant in certain portions of the state, and is absent of large portions.

The forests of Washington cover the Cascade region, the coast, and the western part of the state, and the coast, except for a few high mountains of the Coast range and of the Cascade. They extend eastward along the coast for a part of the state to the west in the coast, covering most of the country eastward as far as the coast, but not as far as the coast, along the coast to the coast.

*This paper is published by the National Geographic Society, Washington, D. C., and is the property of the Society. It is published by the Society, and is the property of the Society.

any in a timber for use in its boat and other, work. The forests of the Blue mountains cover a considerable area. Although I estimate that out of the total area of the state 47,500 square miles, or 1 per cent, are wooded. As this is not, however, correct, with an admirable forest, I assume that each of it is inferior in character and other large areas have been cut or burned and are now growing up again.

From the above collected forest data the total amount of standing timber in the state to be in the neighborhood of 187,000,000,000 feet, which amount more than two-thirds, or 67,000,000,000 feet, are found west of the crest of the Cascade range the remainder 120,000,000,000 being upon its east slope and in the northern and eastern portions of the state. This is the amount as estimated upon the basis of the practice of the lumbermen of the west coast, where the standard for lumber is extremely high and the practice is rather very wasteful. For instance, in the removal of trees is at times as much as at least 100 stumps each 90 feet in length and each of which will average 15 inches, or have a diameter of the trunk of at least 2 feet, not a sixth of one which at all times only clear lumber being cut. The remainder of the tree after so cutting the portion so described, is left to rot or to add to the conflagrations which sweep through the region every summer.

The forests west of the highest parts of the Cascade range are composed of 40 per cent of red fir, 30 per cent of cedar, 14 per cent of hemlock, and 8 per cent of spruce. The fir is found almost exclusively in the deep-seated belts of the Cascade and Coast ranges, where the forest is almost entirely composed of it. Its range extends on the northern limit to nearly 6,000 feet, where its place is taken by hemlock and cedar. Toward the Pacific coast the proportion of fir decreases and its place is taken by spruce which is most abundant in the belt on the coast, and by cedar. The hemlock is found not only upon the mountain slopes, which it clings to in much greater abundance than fir.

Yedowine is found only east of the crest of the Cascade range throughout the region it is the predominant growth. At some localities and its place is taken, to a large extent, by tulare and other species more common, which are found only in the region as regards as of no possible use, although further east, where timber is scarce, it is considered to be of value.

The portion of Washington west of the crest of the Cascades, concerning which I have the fullest data, is one in which, from

tion, and the results of these extensive operations, combined with the burning fires which devastated the forest areas of the interior. From the towns which have been established along the coast of the accessible part of this region, however, these cattle which are regarded by the present Indians or primitives could be grazed at a higher rate than 45 per cent have been cleared away by cutting or fire, within briefest times. About 25 per cent of the entire area has been cleared, and at 25 per cent has been cleared. Presumably the amount of land cleared and burned at this value is at least proportional to the area, and therefore it would follow

that this part of West Africa has been destroyed since its occupation by whites. We cannot explain of the cutting process, and it is clear with some sort of economy, but no doubt it is a fact that the land is being cleared away with a lower rate of efficiency as compared with the land to be destroyed by fire.

ANNALS OF THE ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The 11th Anniversary Meeting of the Association for the Advancement of Science was held in Boston, August 22 to 27. As was anticipated, the return of the Association to the city of its birth for the celebration of its semi-centennial was

most successful.

Of the 600 or more papers presented many contained important contributions to the different sciences. Those of especial geographical interest were for the most part read in Section E.

On August 25, on that occasion Dr Marcus Baker, chargé d'affaires to the Venezuelan Ministry of Commerce, discussed the Venezuelan-Brazilian and Boundary Dispute. Prof. W. J. Moses, Vice Pres-

ident of the United States. Mr Mark S. W. Johnson ex-

plained the Venezuelan situation. Mr. Mendenhall of the Department of Agriculture presented some

the Laws of Work in Government Forestry" by Mr G J. Hoar; "The Forestry Conditions of the State of Washington" by Mr Henry C. Gable; "The Better Root Forest Trees"

Mr Richard L. Coodge, and "The Five Civilized Tribes and the Topographic Survey of Indian Territory," by Mr Charles L. Hitchcock. Of these various addresses and papers four are published in the present number of this journal.

Among the papers read at other times, or before committees and other societies, may be mentioned the lecture before the Section of Geography and Geography, "Geography and Resources of the Siberian Island of Sakhalin," by Prof. Dr. H. L. Henshaw; "The Development of the Ohio River," by Prof. W. C. Cragg, and "The Continental Divide in Nicaragua," by Mr C. Wilbur Hayes; before the Section of Anthropology, "The Maori of New Zealand; His History and Country," Hon. Hugh H. Lusk, of London; "Origin of the Confederacy of the Five Nations," by Mr C. L. Henshaw; "The Disappearance of the C. & D. Dwellers," by M. Desire Charnay, of Paris; "The South Sea Island Eskimo," by Mr A. L. Keweler; "The Philippine Islands and their People" and "Monks, or Master Pirates of the Southern Philippines," by Prof. Dean C. Worcester, and before the Section of Economic Science and Statistics, "Cuba: Past, Present, and Future," and "Nicaragua and the Canal or Watered Nation;" "The Development of Colonial Policy," by Prof. John Davidson; "The Progress of the Marine

War," by Mr. J. W. Foster, of New York; "The Canal," by Prof. Albert T. Hibbard.

It is much to be regretted that at several sessions the large number of papers to be presented precludes all possibility of doing justice to the papers presented. It is hoped that some provision will be made for the presentation of future meetings if some limitation were

papers to be submitted.

Not even this brief narrative of the proceedings of the Association in one single meeting should be permitted to go without reference to the admirable arrangements made by the Local Committee, Cambridge, Lexington, and other places, and to the excellent

the presidential chair is to resign to secretary for 25 years.

Dr Frederic Ward Putnam, the distinguished Penology Professor of American Archaeology and Ethnology in Harvard University

הוא יתן ביטחון ויחסינות לבעלים ולמנהל, ויבטיח את המעורבות של הבעלים במנהל. כלומר, יבטיח את המעורבות של הבעלים במנהל, ויבטיח את המעורבות של הבעלים במנהל.

7. *Conclusions* – The results of this study indicate that the use of a
 3D model can be an effective tool for teaching and learning the
 concepts of the 3D coordinate system. The study also found that
 the use of a 3D model can help students to visualize the
 concepts of the 3D coordinate system more clearly and
 understand the concepts more deeply.

SECTION 4: Other knowledge being learned from the Unit (if any) on a daily basis. (500 characters or more)

החלטתו של בית דין זה, תהיה כפופה להחלטת בית דין זה, וכל החלטת בית דין זה, תהיה כפופה להחלטת בית דין זה.

Methodology

* Secretary of Agriculture said he would like to see the [proposed bill] go back to committee so they can do more work on it before it goes to the House of Representatives.

341194-23 14 02/12/2000

1. **Introduction:** The first paragraph introduces the topic of the research paper, which is the impact of climate change on the environment. It states that the purpose of the study is to investigate the various ways in which climate change is affecting the planet and to identify the most significant threats to the environment.

September 9. The Board of Managers who meet after a brief vacation including a letter to the Vice-President of Princeton and a letter asking President Johnson to put a testimonial on record.

As shown in Fig. 1, the α phase is stable at the lower end of the temperature range of the diagram of Martensite, or when the degree is to decay by 10% or more, depending on the appearance of the lower β phase. The β phase is not stable when the degree is to decay by 10% or more, depending on the appearance of the lower β phase. The β phase is not stable when the degree is to decay by 10% or more, depending on the appearance of the lower β phase.

4. $\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n f\left(\frac{k}{n}\right) = \int_0^1 f(x) dx$

1944, p. 45). It is therefore rather surprising that the first use of the term by the United States Forest Service and the Bureau of Mineralogy and Geology was in 1946, in the publication of a circular memorandum which stated that "the term 'wilderness' is hereby defined as an undeveloped area of land which is so situated that it is best left in its natural state, and which is of such a character that it is best left in its natural state."

1. The respondent has a 1984 year 1 record of a nonresidence of 1 month and 1 day in the month of November, 1984, and a record of 1 day in the month of December, 1984. The respondent has no record of a nonresidence in the month of January, 1985.

SENT BY THE HOUSE OF REPRESENTATIVES, JANUARY 18, 1874.

[illegible]

4. Γ is a \mathbb{Q} -algebra

Source: <http://www.fishbase.org>. The scientific names of the Scientific names of the species of *Micropogonias* were obtained by using the online tool <http://www.fishbase.org> and the species were identified by using the online tool <http://www.fishbase.org>. The species were identified by using the online tool <http://www.fishbase.org>.

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Article 1. The annual date of private and public meetings shall be held on the first day of June.

Article 2. The annual date of the Society shall be held on the first day of June. The annual date of the Society shall be held on the first day of June.

Article 3. The annual date of the Society shall be held on the first day of June.

Article 4. The annual date of the Society shall be held on the first day of June.

Article 5. The annual date of the Society shall be held on the first day of June.

Article 6. The annual date of the Society shall be held on the first day of June.

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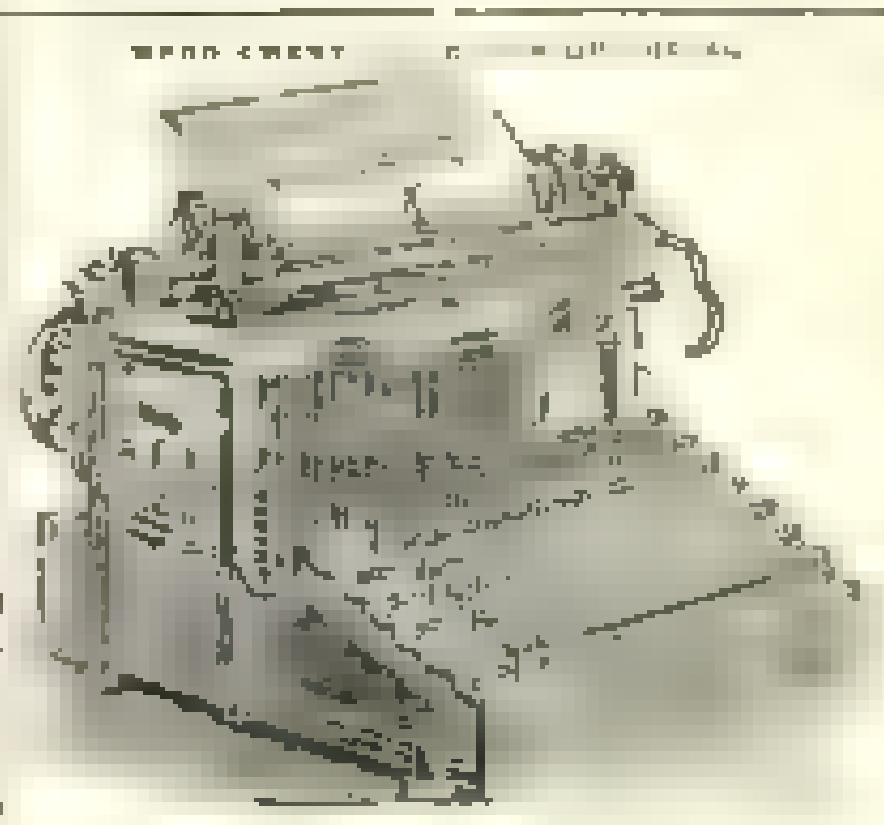
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